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June 29, 2017

Dr. David H. Milne
5301 SE Lynch Road
Shelton, WA 98584

Mr. Bob Wubbena
2201 Bayside Place NE
Olympia, WA 98506

Dear Dr. Milne and Mr. Wubbena,

Thank you for your recent letter to the Department of Ecology regarding the Budd Inlet TMDL. I am the new Budd Inlet TMDL lead and I appreciate the effort it took for you to develop these comments and provide them to Ecology. We attempt to make our information as accessible as possible and appreciate constructive feedback on how to improve figures, data visualizations, and scientific descriptions. As you know, we are in the middle of a long process and will provide more opportunities for public comments. As we produce materials we invite you to continue commenting during public review periods.

Before Ecology determines whether to undergo the additional modeling requested in your letter we would like to clarify a few key points, provide some updated information, and ask a few questions regarding your request.

I would like to address your second point first, regarding the formats for portraying water quality violations, as I think it will help me address your modeling requests. As you've requested, Ecology has switched to displaying our model predictions in absolute DO[1] (instead of the change in DO). Please see the attached series of maps (Appendix 1). Map F is the one you've requested – showing absolute DO throughout Budd Inlet. Cells with DO below the 5 mg/L standard south of Priest Point Park and below the 6.0 mg/L standard north of Priest Point Park are outlined in red, indicating a violation occurs. As you'll note, there are no violations of the 5 or 6 mg/L criteria under natural conditions, yet under existing conditions nearly two thirds of the Inlet violates standards.

One additional clarification I'd like to make is why we often refer to East Bay (cell 31) when discussing our modeling results. This is because a violation of the water quality standards occurs when DO drops below the criteria at any location at any single time. Since East Bay usually has the lowest DO, we use East Bay to determine what would need to occur for standards to be met throughout Budd Inlet. When EPA reviews our TMDL they will be looking to ensure that standards are met in every area of Budd Inlet. As you'll note in Map F, even if East Bay were removed from our analysis, similar measures would need to be taken to meet standards throughout Budd Inlet.

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[1] *This format was first shared at the November 17th, 2016 DAG meeting.*

On the second page of your letter you conjecture that the flow of the dam is recirculating nutrients that enter Budd Inlet from the rest of Puget Sound and therefore wrongfully attributing DO depletion to the dam, instead of from the greater Puget Sound. You are asking us to model two scenarios – one where we remove nitrogen and carbon from the water coming in through the open boundary and one where we remove nitrogen and carbon from the water coming from the dam.

Ecology has not done any modeling where we set certain parameters to "zero". Instead, we set them to "natural" conditions. We do this because the TMDL regulates the *anthropogenic* impact on the system. Setting these parameters to zero would instead determine the combined impact of anthropogenic and natural factors. Additionally, in a scenario where these parameters are removed (or set to zero) for any source, we would indeed anticipate seeing some sort of improvement in DO levels, since this would be akin to diluting Budd Inlet with distilled water. We question the usefulness of such model runs and suggest that the attached figures may be more helpful in looking at individual impacts in isolation. The figure in Appendix 1 shows the impact of the dam, nonpoint sources, waste water treatment plants, and anthropogenic external sources on Budd Inlet, both spatially and quantitatively. Maps B - E in this figure were created by running the model with conditions set to natural, except for the condition of interest, which is set to its existing load. As you can see, anthropogenic external sources do have an impact on the DO (see map B) – but not enough by itself to cause violations of the water quality standard.

You also reference some figures that quantify the DO depletion in mg/L for each of the sources (Figure 1 and 2 in your letter). We have updated this figure[2], please see Appendix 2. This set of graphs shows that under natural conditions the DO in cell 31 is 5.7 mg/L and that the combination of human sources reduces this by 2.7 mg/L to 3.0 mg/L. However, the water quality standards state that DO must be above 5.0 mg/L, meaning that the total allowable DO depletion is only 0.7 mg/L. While this is an updated graph, it is similar to the ones you reference in your letter and still depicts Capitol Lake as the major contributor to DO depletion. I understand that you feel this is inaccurate, however Ecology stands by this conclusion.

I am unsure of the origin of the final bar graph that you reference (Figure 3) in your letter. Could you please point me towards this graph so I may better understand it and the context in which it was originally presented? Also, I'd like to point out that this graph only includes nitrogen loads, which is only one of the many factors contributing towards DO depletion in Budd Inlet.

Again, thank you for your letter and interest in the Budd Inlet TMDL. Please feel free to contact me directly if you would like to further discuss your modeling requests. As I've mentioned, we question how they will contribute to our understanding of Budd Inlet water quality, but we are always willing to continue this discussion. We plan to present our new modeling results to the Deschutes Advisory Group when they are complete, likely early fall.

Sincerely,

Leanne Weiss

Leanne Weiss
Budd Inlet TMDL Lead

CC: Thurston Conservation District

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[2] *A version of this graph was first shared at the May 18th, 2017 DAG meeting. It has since been updated to the version presented here.*

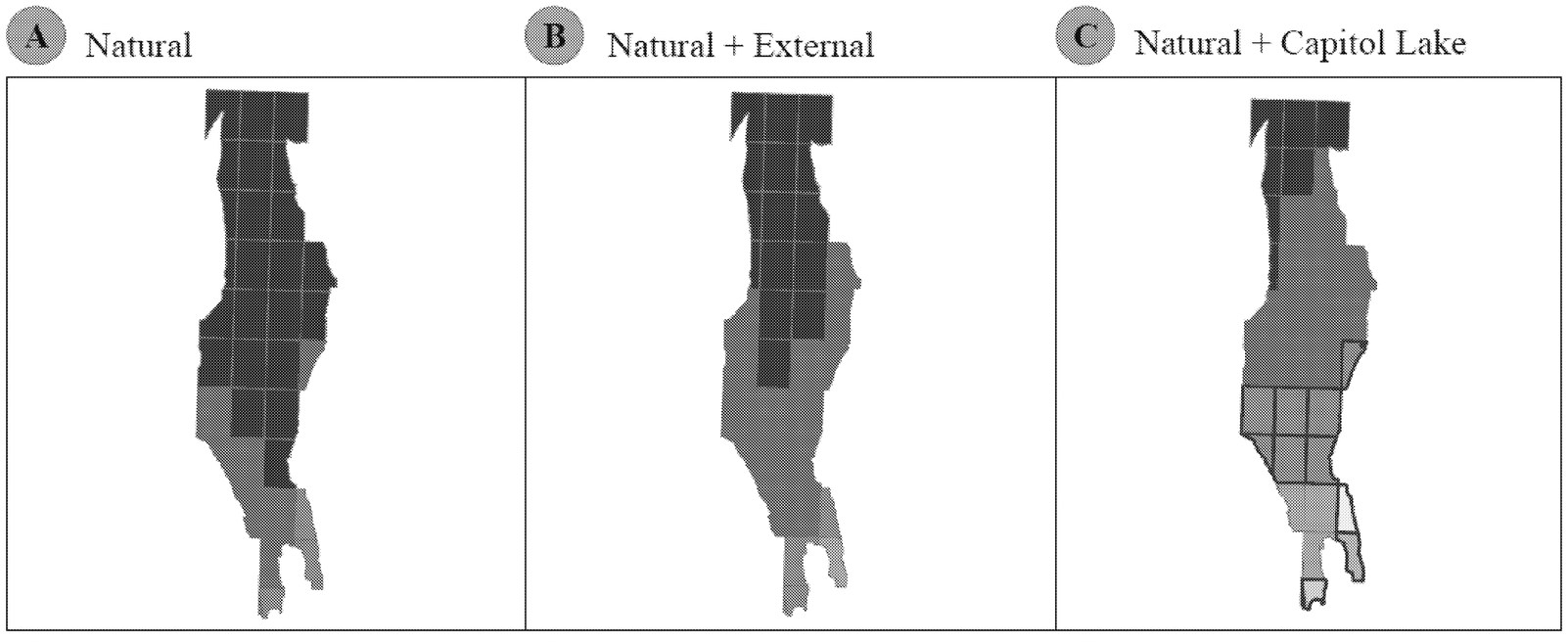
Appendix 1: Maps of DO in Budd Inlet, under different scenarios.

Dissolved Oxygen

Under natural (A) and existing condtions (F) and contribution from individual sources (B-E).

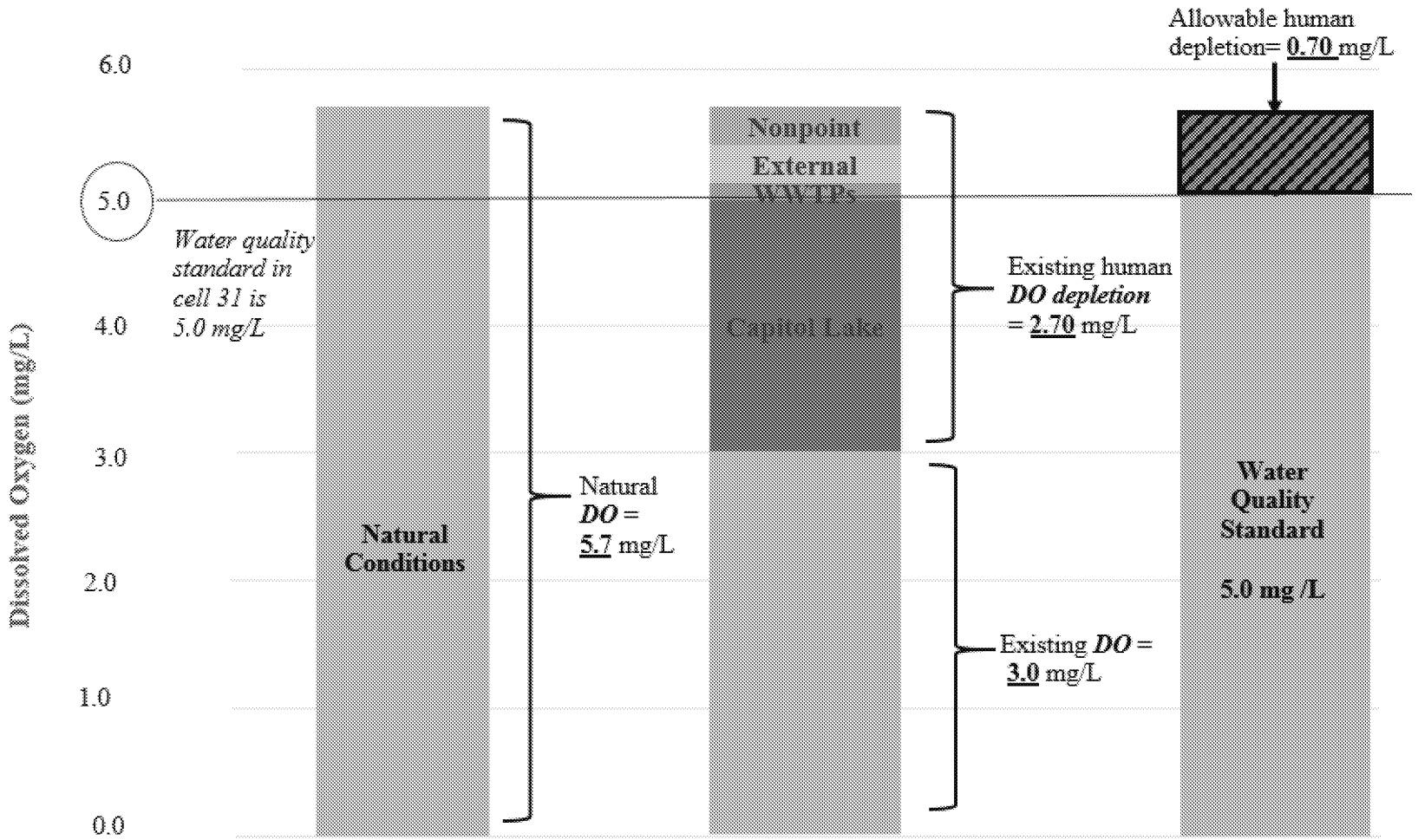
Dissolved Oxygen (mg/L)

- <3
- 3.0 - 3.5
- 3.5 - 4.0
- 4.0 - 4.5
- 4.5 - 5.0
- 5.0 - 5.5
- 5.5 - 6.0
- 6.0 - 6.5
- >6.5
- Violation



"Natural" refers to conditions where there is no 5th Street Dam, no WWTPs, and no anthropogenic nonpoint or anthropogenic external loading.
Each of the subsequent maps (B - E) add in the anthropogenic effect of each of these sources individually.
"Existing" refers to conditions where loading from all anthropogenic sources is present.

Appendix 2: Maps of DO in Budd Inlet, under different scenarios.



A) Under natural conditions, DO in cell 31 is 5.7 mg/L and meets the water quality standard of 5.0 mg/L.
B) Under existing conditions DO in cell 31 is 3.0 mg/L. Nonpoint and external sources, WWTPs, and Capitol Lake deplete oxygen by 2.7 mg/L. The water quality standard of 5.0 mg/L is not met.
C) In order to meet standards human sources must not deplete oxygen by more than 0.70 mg/L.